

# ColorProse™

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Communicating Color Expertise To Color Professionals Worldwide

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## Just What Is A CMC DE?

The American Association of Textile Chemists and Colorists, ISO, and other organizations involved in establishing standardized testing methods important to the textile and apparel industries, have adopted the CMC (Colour Measurement Committee) formula for evaluating small color differences. The official AATCC procedure is titled “Test Method 173-1998, CMC: Calculation of Small Color Differences for Acceptability.”

The CMC calculation is the result of decades of dedicated effort to develop a good correlation between visual and instrumental color difference evaluation. It is generally believed that CMC is good enough to permit the adoption of a single-number tolerance for judging the acceptability of a color match in most situations, regardless of the color of the standard and the direction of the color difference of any trial from it.

That means, for example, that if a shade submitted by a vendor is read on a spectrophotometer against a standard, and the calculated CMC DE is less than a predetermined value, it's good to go!

The great thing is that decisions can be made with confidence even at remote locations throughout the supply web. Only the problems and exceptions (theoretically) will need to be evaluated by a higher authority.


### Well, what could go wrong?

There are two important fundamentals that must be addressed up front. First, a central authority must establish a repeatable, reliable instrumental measurement technique, and the entire supply web must be equipped for the procedure and disciplined enough to use it faithfully.

Simply put, if measurements are not reliable, the acceptability decision will not be reliable. Issues such as sample thickness, sample presentation, sample conditioning, number of reads, the calibration of the instrument, its mechanical and optical condition, etc. must be standardized, and all acceptability measurements must be made the same way every time.



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The second fundamental is that an appropriate CMC DE tolerance must be decided. The original intention was that a color difference of less than 1.0 CMC DE for an average observer would be an excellent starting point for tolerance for most end-use materials. Ideally, this tolerance is developed through a planned series of trials, and once established, all participants in the process must agree to accept the results.

Many commercial processes combine instrumental and visual expertise in their acceptability decisions. Color differences of less than a certain value — for example 0.8 CMC — are automatically accepted, and differences of greater than a certain value — say 1.2 CMC — are automatically rejected. Between 0.8 and 1.2 CMC, a visual decision must be made by an experienced expert with competent visual acuity.

The most serious abuse of an automated acceptability process we have seen is the attempt to force better quality by unrealistically tightening the CMC DE tolerance. The average observer, unaccustomed to evaluating color differences, will have trouble seeing differences of less than 1.0 CMC DE. Even the most highly experienced color expert will have difficulty seeing color differences smaller than 0.3 CMC DE. Setting acceptability tolerances of less than about 0.5-0.6 CMC DE usually begins to trade off “better” matches for more stress, aggravation, slower delivery and higher costs.